RADECCA, Inc.

142786 77

Give this guy a call & see if they've done anything w/ soggy PCB's!
Jack

March 30, 1983

Mr. Rich Bartelt, Chief
Remedial Response Branch
U.S.E.P.A. - Region 5
230 S. Dearborn Street
Chicago, IL 60604

Dear Mr. Bartelt:

Thanks for your help.

Here are several packets of Radecca information.

In summary:

* Our LOCKSORB material
  * solidifies and stabilizes organics (radical organic leachate reduction).
  * offers dramatic cost savings through small volume increase for solidified organics.
* Our KLENSORB granulated material
  * is a companion technology for granulated activated carbon.
  * uses same hardware as G.A.C.
  * is good at things G.A.C. is not good at, and visa versa.

* I would like to make a brief (20-30 minutes plus questions) presentation to appropriate persons within Remedial Response Branch. The purpose will be to present the technology and explore its capabilities as well as its limitations. We feel it is an appropriate technology for a variety of remedial site circumstances.

I will call again soon.

Very truly yours,

Ryan Petty

Ryan L. Petty, J.D.
Accounts Manager

RLP/dcm

cc: Mr. Robert J. Bowden

Enclosures

8501 Mo-Pac Blvd./P.O. Box 9948/Austin, Texas 78766/(512)454-1420

05-5M28.01/056

RADECCA, Inc.

SORBENTS FOR INDUSTRY

Price Schedule
Effective July 1, 1982

Price per pound	40,000 lb. or more	30,000 lb. or more	2,000 lb. or more	less than 2,000 lb.
LOCKSORB 100™	$1.25	$1.30	$1.40	$1.50
BREAKSORB 100™	$5.00	$5.05	$5.15	$5.25
KLENSORB 100™	$1.65	$1.70	$1.80	$1.90
KLENSORB 110™	$5.00	$5.05	$5.15	$5.25
DAFSORB 100™	$5.00	$5.05	$5.15	$5.25

Add $.05 pound for continental U.S. shipments of more than 1000 miles.

F.O.B.: Austin, Texas – minimum freight prepaid and allowed

Terms: Net 30 days from date of shipment

Minimum Billing: $750.00

LOCKSORB, BREAKSORB, and DAFSORB are packaged in 50-pound polylined bags with 40 bags per pallet.

KLENSORB is packaged in 75-pound fiber drums with 27 drums per pallet.

Pallets are supplied at no charge.

Prices are subject to change without notice.

RADECCA, Inc.
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More Good News
For D.A.F. Operators

- NO OTHER CHEMICAL ADDITIVES are required. (i.e., flocculants, etc.)
- ELIMINATION OF TURBIDITY problems associated with other coalescing agents.
- The stable DAF-SORB float RESISTS REDISPERSION during flow surges.
- Fluctuations in organic concentration are easily handled by DAF-SORB's WIDE DYNAMIC ABSORPTION range.
- LOWER COST per gallon of water treated.
- DAF-SORB 100™ is a NON-TOXIC stable powder.
- Foaming problems are REDUCED OR ELIMINATED.
- A granulated companion product, KLEN-SORB™, is available for POST-D.A.F. POLISHING.
- Valuable ORGANICS CAN BE RECOVERED, if desired, from the DAF-SORB float.
- DAF-SORB is available for IMMEDIATE SHIPMENT.

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RADECCA'S

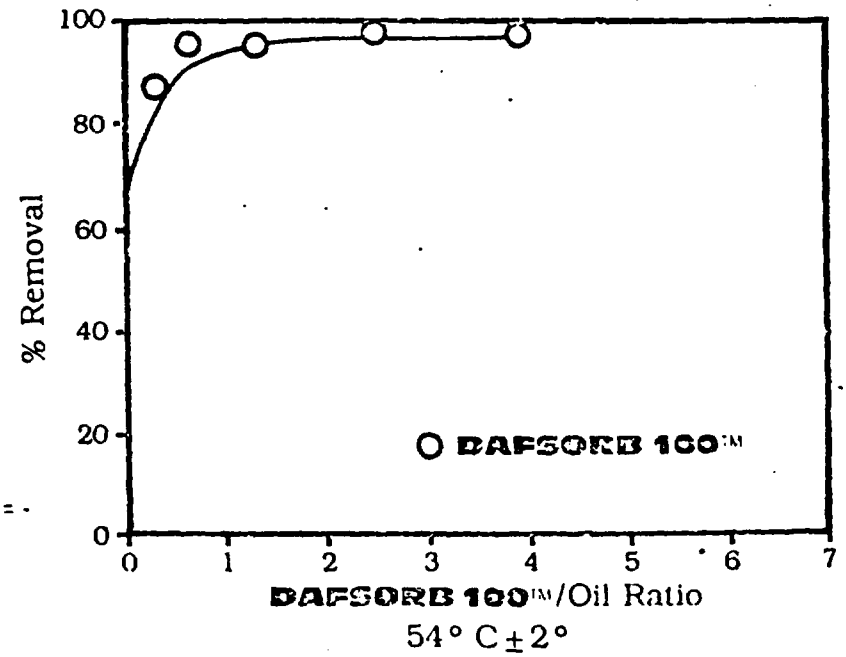
DAFSORB 100™

Patents Pending

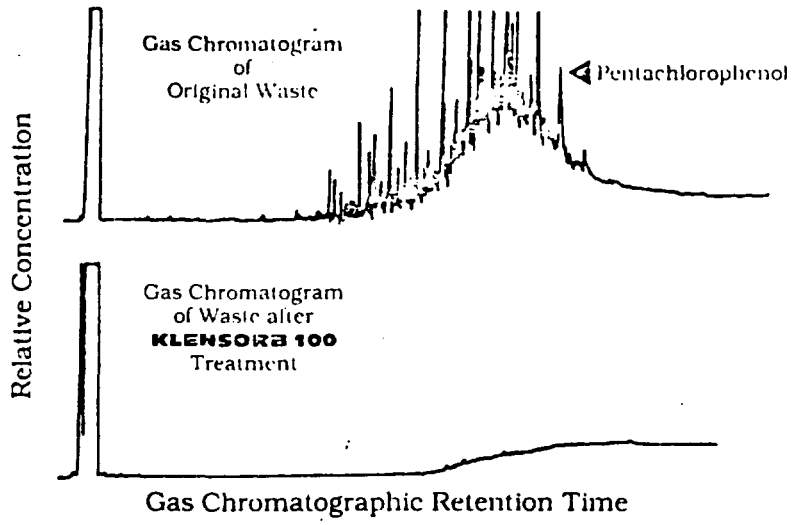
A Breakthrough in the Removal of Organics from Water

- removes SUSPENDED AND DISSOLVED ORGANICS from water in dissolved air flotation units
- a cost effective REPLACEMENT FOR COALESCENT MATERIALS
- DAFSORB 100™ provides an EXCEPTIONALLY STABLE FLOAT
- DAFSORB 100™ float can be LANDFILLED OR INCINERATED EASILY

Data for DAFSORB™ Oil Removal in Static D.A.F. Tests



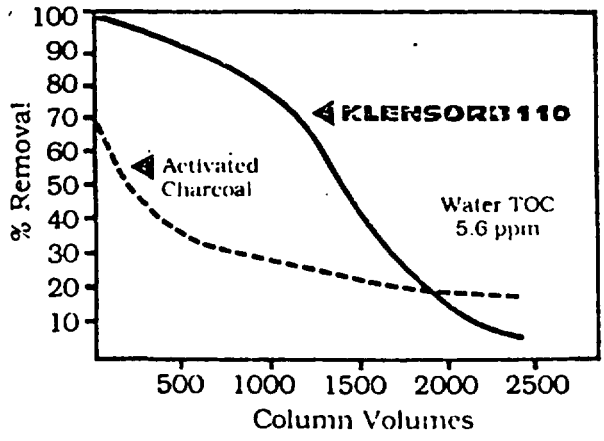
KLENSORB™ 100 Filtration Results
Treatment of Wood Preservative Wastewater



More Good News for Water Treatment

- KLENSORB TRULY ABSORBS (not adsorbs) ORGANICS, GIVING IT GREATER CAPACITY.
- CAN BE INCINERATED along with absorbed organics.

Removal of Humics from a Florida Groundwater
KLENSORB™ 110 versus Activated Charcoal



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Affiliate of Rohm and Haas Company

RADECCA'S

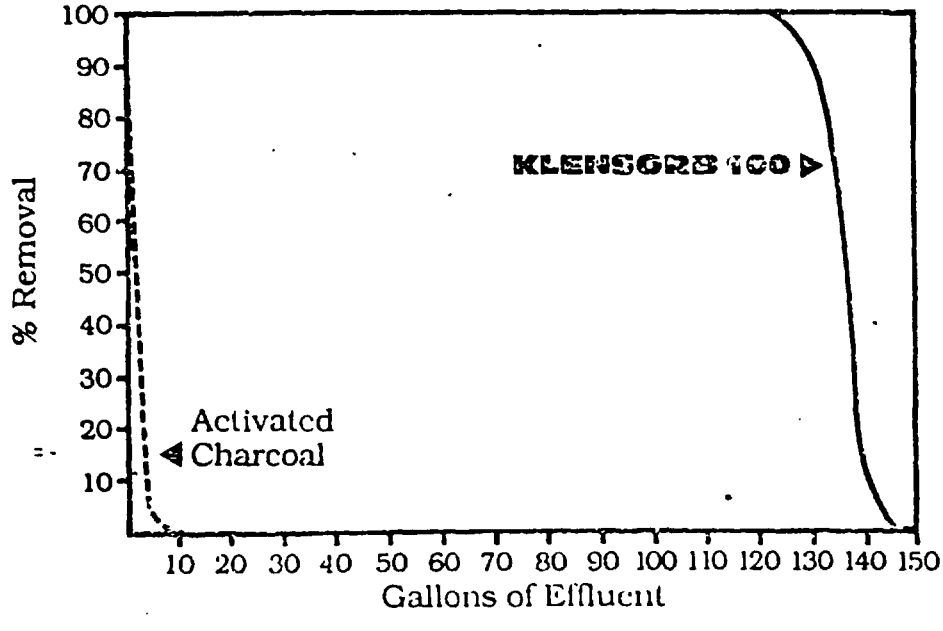
KLENSORB™

Patents Pending

A Breakthrough in the Removal of Organics from Water

- a COST EFFECTIVE ALTERNATIVE to activated charcoal (G.A.C.)
- ESPECIALLY EFFECTIVE for those organics that are difficult for G.A.C. (i.e., oil, humic acid, etc.)
- GREATER SORPTION CAPACITY than G.A.C. for most organics
- LARGE DYNAMIC RANGE of treatable concentrations (5000 ppm to 1 ppb)

Removal of Oil from Water
Influent Concentration of 50 ppm
Flowrate 1 gpm/ft^2



Measurement of Volatile Emissions from a Class I Toxic Waste Solidified with BREAKSORB™

WASTE	KILN DUST	FLY ASH	BREAKSORB	SNIFFER PPM IN GAS PHASE
20%	80%	—	—	90
20%	78%	—	2%	18
20%	75%	—	5%	3
20%	70%	—	10%	BDL
20%	—	80%	—	90
20%	—	78%	2%	BDL
20%	—	75%	5%	BDL
20%	—	70%	10%	BDL

BDL = below detection limits

Percent of Organics* Leached in Batch Equilibration for Synthetic Waste at pH 7

BREAKSORB g/5 ml	HCP (%)	Parathion (%)	Benzene (%)	1,2 Dichlorobenzene (%)
15	BDL	BDL	42	BDL
8	BDL	BDL	52	4
4	BDL	2	50	BDL
2	BDL	BDL	53	16
1	BDL	BDL	55	25
0.5	16	13.5	55	16

*Based on leach obtained from same waste solidified by fly ash alone.
HCP = Hexachlorocyclopentadiene
BDL = below detection limits

BREAKSORB™

- a nontoxic powder in 50 lb. bags
- truly absorbs oil and organic chemicals rather than merely adsorbing them
- reduces volatile organic emissions by several orders of magnitude
- greatly retards leaching of sorbed organics for landfill purposes
- can be combined with lime, kiln dust, fly ash, and other bulk materials for landfill uses

Comparative Efficiencies of Various Sorbents for Sorption of 100 Pounds of Crude Petroleum

	POUNDS NEEDED	WEIGHT OF SOLIDIFIED MATERIAL	SORBENT COST[1] $/POUND	SORBENT COST[1] $ TO SOLIDIFY 100 POUNDS OIL
BREAKSORB™	2.5	102.5	5.00	12.50
3M – LSM	5	105	3.25	16.25
Conwed™[2]	5	105	3.25	16.25
Hazorb™[3]	11	111	2.50	27.50
Imbiber Beads™[4]	14	114	8.25	115.50

1. Approximate cost July, 1982
2. Degrades in humid environments and can be eaten by rodents (Conwed Corporation)
3. Sorbs water or oil indiscriminately (Diamond Shamrock Corporation)
4. Slow sorption process (EMCO, subsidiary of ENSCO, Inc.)

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RADECCA'S

BREAKSORB™

Patents Pending

A Breakthrough in Liquid Disposal Technology

- breaks difficult oil/water emulsions quickly and efficiently
- can be incinerated with absorbed oil or chemicals
- has 7000 Btu per pound in energy value
- absorbs many times its weight of most organic chemicals and solvents (e.g., toluene, xylenes, dichloromethane, etc.)
- does not absorb water

BREAKSORB™ Applied to Breaking of Organic Water Emulsions

TYPE OF EMULSION	COMPOSITION	BREAKSORB™ DOSE	PERCENT OF WATER RECOVERED
API Separator Sludge	60% organic, 40% water	2.5%	98%
API Separator Sludge	80% organic, 20% water	2.5%	95%
Hazardous Waste	⅓ solids, ⅓ organic, ⅓ water	2.5%	98%
Rolling Mill Emulsion	5% solids, 45% organic, 50% water	7%	98%

Typical Savings For Landfill Operations

WASTE TYPE	VOLUME AFTER SOLIDIFICATION	MATERIAL[1] COSTS	MIXING[2] COSTS	TRANSPORTATION[3] COSTS	DISPOSAL[4] COSTS	TOTAL COSTS
API SEP. SLUDGE						
Fly ash only	5.0	$79	$35	$22	$85	$221
LOCKSORB	1.6	85	11	7	27	130
CLASS 1 TOXIC WASTES						
Fly ash only	4.2	64	29	19	105	217
LOCKSORB	1.5	70	11	6	38	125
CLASS 2 TOXIC WASTES						
Fly ash only	3.3	46	23	15	56	140
LOCKSORB	1.3	35	9	6	22	72

1. Based on 40,000-lb. price for **LOCKSORB** (7-1-82)
2. Mixing costs based at $7.00 per yard^3
3. Transportation costs are set at $.15/yd^3 per mile (assuming 30 mile transport)
4. Disposal site cost:

Non-hazardous waste	$17.00 per yard^3
Hazardous waste	25.00 per yard^3

RADECCA, Inc.
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RADECCA'S

LOCKSORB™

Patents Pending

A Breakthrough in Liquid Disposal Technology

- solidifies ORGANIC liquids, sludges, for landfilling
- greatly RETARDS LEACHING of most organics
- REDUCES VOLATILE EMISSIONS
- reduces solidified waste volume resulting in SUBSTANTIAL SAVINGS in mixing, transportation, and disposal site cost

Comparative Volumes Produced by Solidification of 4 Typical Liquid Wastes with Fly Ash and with LOCKSORB™

WASTE YD^3	FLY ASH ALONE YD^3	LOCKSORB™* + FLY ASH + WDA** YD^3
API Sep. Sludge (~50% water)	5.0	1.6**
Toxic oil waste	4.1	1.6
Greasy waste	3.3	1.3
Toxic waste w/~ 30% water, solids	4.2	1.5**

*2–5% by weight LOCKSORB™

**WDA = water demanding agent – water content is also solidified

Typical Disposal Savings Using LOCKSORB™

Table 1 Drum Disposal of Organic Waste

Waste	Material Cost	Volume Increase	[illegible] Cost	[illegible] Cost	[illegible] Cost	[illegible] Cost	[illegible] Cost	LOCKSORB Savings
Toluene								
LOCKSORB and Clay	$40.15	[illegible]	[illegible]	$2.50	$ 6.2[illegible]	$31.25	$ [illegible]	$63.39
Clay only	26.51	200%	24.00	6.00	15.00	75.00	146.54	
Transformer Oil								
LOCKSORB and Clay	33.72	25%	3.00	2.50	6.2[illegible]	31.25	70.72	$87.65
Clay only	22.57	250%	30.00	7.00	17.5[illegible]	87.50	164.57	
Paint Sludge								
LOCKSORB and Clay	[illegible]	25%	[illegible]	2.5[illegible]	[illegible]	[illegible] 25	[illegible]0.58	67.03
Clay only	[illegible]	175%	21.[illegible]	5.50	13.7	66.75	127.61	
Mixed Solvents								
LOCKSORB and Clay	36.02	40%	4.80	2.80	7.00	35.00	85.62	28.75
Clay only	20.77	140%	16.80	4.80	12.00	60.00	114.37	

[1]Clay Cost of $0.0325/lb
[2]Drum Cost of $12/drum
[3]Mixing Cost of $2/drum
[4]Transportation Cost of $0.05/mile (assume 100 miles)
[5]Disposal Cost or Fee of $25/drum (assume 50 gallons of waste/drum)
[6]LOCKSORB savings are per drum of waste to be solidified

Table 2. Bulk Disposal Costs/Yd³ Using LOCKSORB

Waste	Material Cost[1]	Volume Increase	Mixing Cost[2]	Transportation Cost[3]	Disposal Cost[4]	Total Cost	LOCKSORB Savings
Toluene							
LOCKSORB and Clay	$146.00	25%	$ 8.75	$18.75	$ 62.50	$236.00	$ 76.52
Clay only	96.52	200%	21.00	45.00	150.00	312.52	
Transformer Oil							
LOCKSORB and Clay	[illegible]	25%	8.75	18.75	62.[illegible]	[illegible]2.60	$121.48
Clay only	[illegible]2.08	250%	24.50	52.50	175.00	[illegible]4.08	
Paint Sludge							
LOCKSORB and Clay	63.92	25%	8.75	18.75	62.50	153.92	$111.72
Clay only	67.64	175%	19.25	41.25	137.50	20[illegible].64	
Mixed Solvents							
LOCKSORB and Clay	131.00	40%	9.80	21.00	70.00	23[illegible]	$ 16.52
Clay only	75.52	140%	16.80	36.00	120.00	248.32	

[1]Clay Cost of $0.0325/lb
[2]Mixing Cost of $7/yd³
[3]Transportation Cost of $0.15/mile/yd³ (assume 100 miles)
[4]Disposal Cost of $50/yd³

These comparative numbers are representative of our experience with a very broad range of organic wastes. The numbers are also substantially similar when LOCKSORB is utilized with and compared to any of the other conventional solidification methods (i.e. kiln dust, fly ash, cement). The numbers are similar because the principle is the same: LOCKSORB sequesters the organics which would otherwise interfere with the cementitious, pozzolanic reactions involved in traditional solidification methods.

Note that, for testing [illegible] LOCKSORB followed by a small amount of clay for additional physical strength. The clay was not necessary to effect solidification. LOCKSORB, in the absence of conventional bulking agents will stabilize and solidify organics to a heavy, putty-like consistency that has no free liquid. The clay is needed only where enhanced physical strength is desired. (Unconfined compressive strengths in excess of 25 psi were achieved in our tests.) Kiln dust, fly ash, and cement can be substituted for the clay which was merely what the client currently utilized. The volume increases in Tables 1 and 2 were recorded following the addition of both the LOCKSORB and clay – *the volume increases using only LOCKSORB* are in the range of 1 to 5%. Thus, in-barrel solidification can often be accomplished with LOCKSORB without decanting organics and without use of extra barrels.

Our experience suggests that the waste volume reduction advantage of LOCKSORB is a possibility worth testing whenever the total organics concentration in the waste to be solidified is greater than 10,000 ppm [illegible] Below 10,000 ppm we expect organics concentrations to interfere only minimally with cementitious pozzolanic reactions.

Even where organic concentrations are below 10,000 ppm, LOCKSORB may, of course, be used if leaching of the organics would otherwise be a constraint on hazardous waste disposal.

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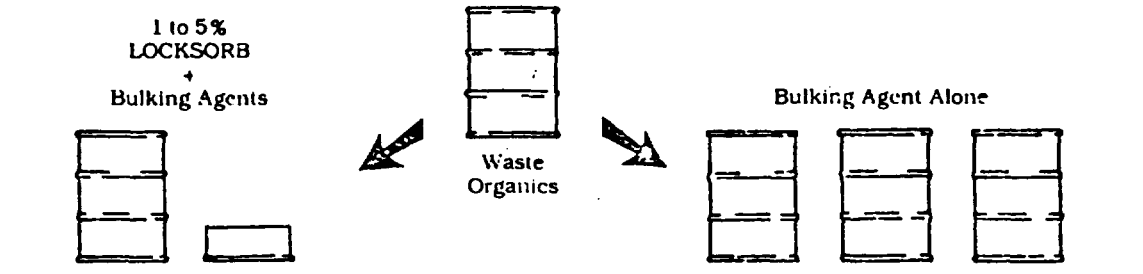
3-83-12180

LAB NOTES

Inc.

Volume I, No. 2
March 1983

Total System Cost Comparison Solidifying Organic Wastes With LOCKSORB



It has become evident over the past few decades that solidification of organic wastes is one of the major technological problems confronting both government and industry. A multitude of solidification methods have been utilized in the past including sorbent clays, pozzolans (i.e., kiln dust, fly ash), and portland cement. All of these methods of solidification suffer from two major problems. The first problem relates to the fact that all of these solidification methods physically *ad*sorb or mechanically trap the organics. This leads to substantial leaching of the organics from the solidified wastes in standard EPA extraction procedures.

The second problem encountered with conventional methods of solidification is that all of them increase the volume of the original waste by factors of 2 to 3½ times the original volume. This kind of volume expansion results in substantial increases in mixing, packaging, transportation, and disposal site expense.

LOCKSORB solves these problems:

LOCKSORB technology overcomes the first problem of leaching since it truly *ab*sorbs and stabilizes the organics thus materially reducing leaching potential. This advantage of LOCKSORB will be addressed more fully in later *Lab Notes*. LOCKSORB also solves the second problem since it will stabilize these same wastes with only 20% to 40% increase in volume.

Radecca recently participated in a client's technical and economic study of stabilization alternatives for organic wastes. The client routinely solidifies organic wastes, in-barrel, prior to disposal in an EPA/RCRA-approved hazardous waste site. The comparative study included four wastes that the client processes routinely for disposal. LOCKSORB technology was compared to their current solidification method (use of a sorbent clay material). The client provided us the costs of mixing, transportation, containers, and disposal site that are actually encountered in the disposal of these organic wastes. The overall results of those tests are summarized in Table 1 (Drum Disposal) and Table 2 (Bulk Disposal). It can be seen that in all four cases substantial savings ranging from $29 to $88 per barrel and $16 to $121 per ton were realized. Based on these results the client subsequently adopted LOCKSORB technology for stabilization of organics.